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AN INTENSE OPTICAL FLARE FROM XY UMa

As part of our on-going program of UBVR photometry of RS CVn stars, we have observed at four colors a flare episode from XY UMa (+55° 1317, SAO 27143), a system with a 0.48 day period. The primary star is G2-G5; the secondary K5 (Geyer, quoted by Loronzi and Scaltriti, 1977). All observations were made with the Capilla Peak Observatory's 61-cm reflecting telescope and a single-channel, photon-counting photometer with an EMR 641A tube cooled to -20°C. The comparison star was +54° 1278 (SAO 21739).

The flare occurred on 31 January 1982 UT as the system was emerging from secondary eclipse at about phase 0.54, the time was 05:14 UT. Figures 1-4 show the flare in the UBVR instrumental bands relative to the underlying light curve. The symbol "+" indicates actual data points; the solid dots are a Stineman fit to the data; the solid lines the average light curve of the system with the flare removed. The data points have a statistical accuracy of ±0.01 mag or better.

The flare peak occurred at about phase 0.55 at 05:29 UT. The total duration of the main body of the flare was about 30 minutes. Note that a much less intense tail appears after the main burst (this tail is especially visible at the V and R bands). Relative to the average light curve of the system, the peak increase in apparent magnitude was 0.30 at U, 0.13 at B, 0.09 at V, and 0.04 at R. At peak, V=9.62, R=8.86, B-V=+0.77, and U-B=0.27.

No optical flares have been previously found in photometric or polarimetric (Geyer and Metz, 1977) observations of XY UMa. However, Patkos (1981) found three flares in 1980 from SV Cam, a system that resembles XY UMa (primary G3, secondary K4, period 0.59 d). The strongest of the three was seen at phase 0.61 as the system emerged from secondary eclipse; its duration was 43 min. and peaked at 0.12 mag above the system at U. Our XY UMa flare had a similar

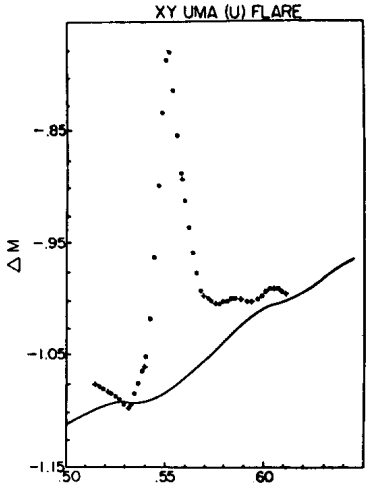

Figure 1

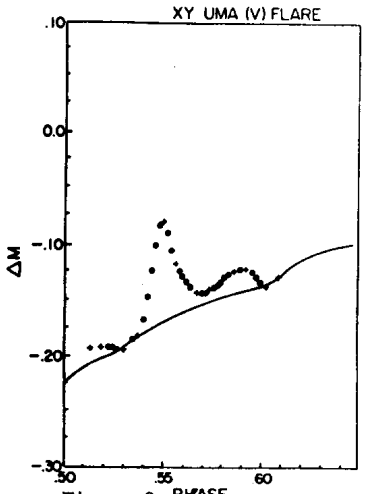

Figure 3

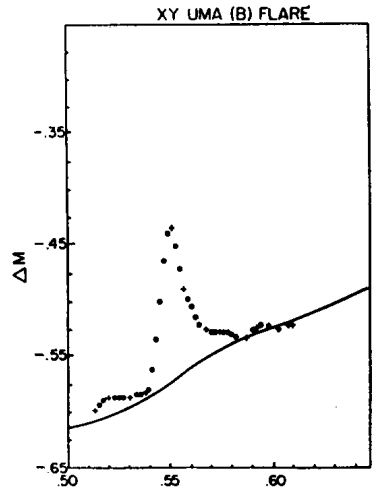

Figure 2

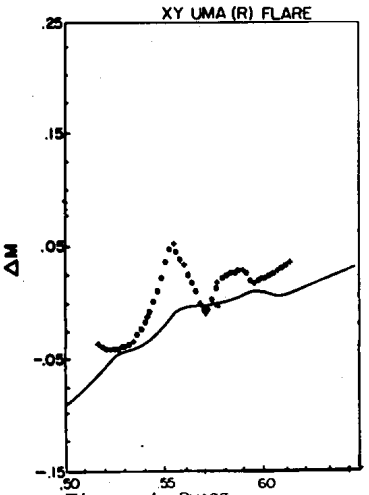

Figure 4

Figure 1-4

duration but a much more intense peak and total flux.

The integrated fluxes are:

Filter	Flux	Flare/Base
U	2.5×10^4 mjy·sec	0.10
B	4.6×10^4	0.05
V	8.0×10^4	0.05

where the last column gives the ratio of the flare's flux to the underlying flux of the system over the same period of time.

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